



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : <b>G06F 1/00, 9/445</b>		<b>A1</b>	(11) International Publication Number: <b>WO 98/07085</b>
		(43) International Publication Date: 19 February 1998 (19.02.98)	
(21) International Application Number: PCT/US97/11548		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 13 August 1997 (13.08.97)			
(30) Priority Data: 08/689,767 13 August 1996 (13.08.96) US			
(71) Applicant (for all designated States except US): BEN SMITH, INC. [US/US]; 127 Washington Street, Belmont, MA 02178 (US).			
(72) Inventors; and (75) Inventors/Applicants (for US only): SMITH, Fred, Hewitt [US/US]; 127 Washington Street, Belmont, MA 02178 (US). SMITH, Benjamin, Hewitt [US/US]; 127 Washington Street, Belmont, MA 02178 (US).			
(74) Agents: RICCI, Christopher, P. et al.; Sullivan & Worcester LLP, One Post Office Square, Boston, MA 02109 (US).			

Published

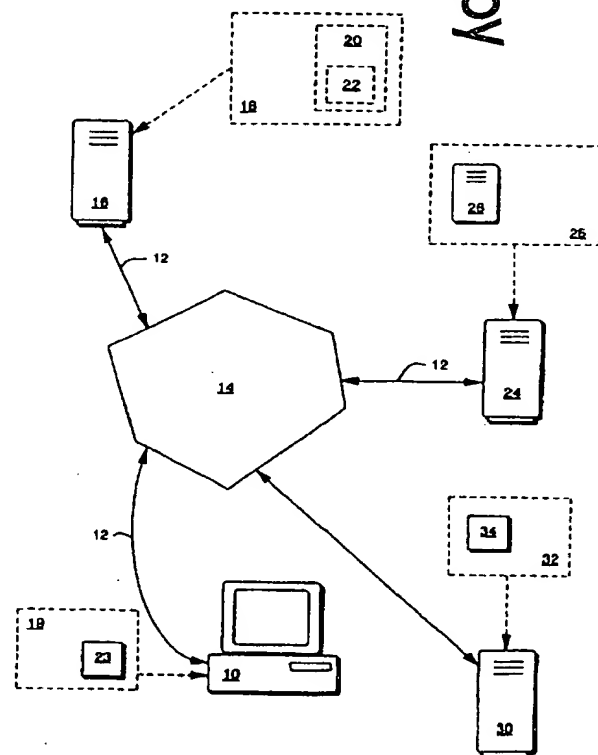
With international search report.

Best Available Copy

(54) Title: SYSTEM AND METHOD FOR DISTRIBUTING SOFTWARE OVER A NETWORK

## (57) Abstract

A system and method is disclosed for distributing, registering and purchasing software applications and other digital information over a network. Each software application is embedded with an agent module which communicates with a remote server module in a server attached to the network. The server module interacts with the user that is requesting installation of the software application and upon verification of billing or other constraints, the server module enables the agent module to proceed with installation. Subsequent to installation, the agent module monitors the server module and informs the user if an update to the software application is available.



**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

Title:     System and Method for Distributing Software Over  
           a Network

Background of the Invention

5       The invention relates to a system and method for distributing software over a network. More particularly, the invention relates to a method for controlling software distribution by embedding a sub-component of the distribution control software in each software application, and having a central monitoring software for monitoring the distribution of the software applications.

10       Digitally encoded information, or software, is one of the most economically important commodities of the era. The ease and economy with which perfect copies can be made and distributed has promoted the spread of software and related technologies through traditional commercial channels such as retail and mail-order sales. More recently, non-traditional distribution channels such as distribution over networks of interconnected computers such as the Internet have become more viable. These non-traditional distribution  
15 channels have made it difficult for software creators and copyright holders to regulate the use of their creations or to receive payment and registration information from their users. Consequently, software producers forfeit substantial revenues and valuable information about their customer base and potential markets while businesses and universities find themselves subject to legal prosecution and intimidation for software piracy.

Various security methods have been employed in an attempt to inhibit illegal copying of software. Such attempts have included software security, such as password protection and requiring original diskettes to initiate startup, for example, and hardware security, such as a dongle, for example, inter alia. Further, hardware-based copy protection techniques, as well as those which involve modification or customization of executable programs, prevent software vendors from exploiting the non-traditional distribution networks that are becoming a mainstay of software distribution in the software marketplace. Therefore, these protection methods have generally proved inadequate for large-scale commercial distribution of software. Thus, most large software companies have relied on shrink-wrap licenses and legal remedies to enforce their copyrights which have proved moderately effective.

Another challenge to the software industry is regulating the installation of software. Since individual users perform most installations of software, the vendor has no control over the software installation. A user can currently purchase software that will not run on the user's computer. The user may not know the limitations of the user's computer hardware or may not understand the software's hardware requirements. If a user purchases software and the user's computer hardware is inadequate to run the software, then various problems are going to occur in the installation and execution of the software on the user's hardware. The user will have to spend much time and effort attempting to resolve the problem, often including multiple calls to the vendor's technical support lines at a cost to both the vendor and potentially the user.

Additionally, companies having large networked facilities can internally have thousands of networked computers accessible by numerous content servers on a single network. Each of the content servers can be running any of various operating systems as can the computers with which the servers are communicating. From an information management standpoint, maintaining such a computer base can be very difficult given that each user may have to install their own software or, in the case of networked software, each server has an individual copy of networked software for a subset of the users.

Many computer users are reluctant to purchase software on-line due to security issues. The possibility of piracy of the software and, more importantly to the user, personal information inhibits many users from taking advantage of this method of transaction. Some on-line services include security features for such information, but generally lack an ability  
5 for the user or the service to audit the security of the transmission. In addition, on-line services generally do not allow the service to keep users informed of new products and releases, unless the users release personal information to the service.

## Summary of the Invention

The aforementioned and other objects of the invention are achieved by the invention which is a system for installing a software application to a remote computer via a network. The network is one which has at least one content server located thereon, which serves data to a plurality of attached computer clients. This network model is intended to include both intranets and internets. That is, the network may be an internal corporate network, an intranet, or a global network of networks such as the Internet, for example. The system comprises a server module and an agent module.

The server module is disposed on the server. The server module maintains a database of software applications and constraints associated therewith. In the case of commercial distribution of the software application, the server module also maintains a database that includes billing information.

The agent module can be embedded in more than one type of software application, and is actuatable by the remote computer to initiate installation of the software application on the remote computer. Upon initiation, the agent module electrically communicates with the server module which selectively enables the installation. In the case of a commercial distribution of the software over the Internet, for example, the user, upon finding a software application which the user wishes to purchase, the user selects the software application. An agent module would then communicate with the server module.

In one embodiment, the agent module would be embedded in the software application the user selected to purchase, and it would be actuatable by the remote computer. After actuation by the remote computer the agent module would communicate with the server module. In another embodiment, the agent module embedded in the software application would remain inactive until after the software application was installed. In this embodiment, a second agent module, which for clarity will hereinafter be referred to as a plug-in, disposed on the remote computer would communicate with the server module. The plug-in would

preferably be installed in the user's browser software, which the user is using to connect to the Internet.

5 The server module can be on a separate remote content server or the same content server upon which the software application is located. The physical location is not important to the individual modules as long as they can communicate electronically. The server module then transfers hardware constraints, pricing information and available options particular to the chosen software application to the remote computer.

10 The user of the remote computer then accepts the pricing, confirms acceptance of license terms and inputs user information, all of which is then transferred back to the server module as identification information. Upon verified receipt of the user's information, the server module then enables the installation of the software application by communicating with the agent module, either the agent module embedded in the software application or the plug-in embedded in the browser. Installation of the software application can then proceed over the network.

15 In further aspects, the invention provides methods in accord with the apparatus described above. The aforementioned and other aspects of the invention are evident in the drawings and in the description that follows.

### Brief Description of the Drawings

The foregoing and other objects of this invention, the various features thereof, as well as the invention itself, may be more fully understood from the following description, when read together with the accompanying drawings in which:

- 5           Figure 1 is a block diagram of the software distribution system of the invention;
- Figure 2 is a data flow diagram for the installation of software over the system of Figure 1;
- Figure 3 is a data flow diagram of a software update procedure for the system according to Figure 1; and
- 10          Figure 4 is a block diagram of a corporate network utilizing the invention.



## Detailed Description

While the present invention retains utility within a wide variety of networks and may be embodied in several different forms, it is advantageously employed in connection with the Internet. Though this is the form of the preferred embodiment and will be described as such, this embodiment should be considered illustrative and not restrictive.

Referring now to Figure 1, a remote computer 10 is shown having an electrical connection 12 to a network 14. The remote computer 10 can be a personal computer, such as an IBM compatible or a MAC, can be a work station, or any other such computer that is adapted to communicate over a network 14. The electrical connection 12 is used generically to indicate a physical connection to a client/server network. Though such a connection can take any of various forms and use any of numerous protocols, in the preferred embodiment communication via the electrical connection 12 uses Transfer Control Protocol/Internet Protocol ("TCP/IP"). TCP/IP is preferred as it is the communication protocol suite required to communicate over the Internet. Communication over the Internet is desirable because the Internet is a global interconnection of multiple content servers which are freely communicable to each other and accessible by an unlimited group of remote computers. For illustration purposes, the network 14 will be assumed to be the Internet, though other possibilities exist, such as electronic mail networks utilizing X.25 protocols.

As previously stated, the network 14 has multiple content servers, one of which is shown in Figure 1 as content server 16. The content server 16, in this example, is owned by a third-party vendor of software. The software can be any digitally stored information including both executable and non-executable digital information. Examples of the foregoing are executable software applications, digitally stored music, digitally stored reference materials, photographs, inter alia. Therefore, any reference to software or software applications contained herein shall be understood to encompass any form of digitally stored information whether or not listed as an example above.

The third-party vendor uses the content server 16 to sell software by using a virtual store 18. The virtual store 18 generally provides a large listing of available software from which a potential purchaser can choose. When a user of the remote computer 10 decides to purchase a software application 20 from the virtual store 18, the remote computer 10 sends a message via the electrical connection 12 over the network 14 and through another electrical connection 12 to the content server 16. Since the virtual store 18 is simply an application running on the content server 16, the content server 16 actuates the installation functions of the virtual store 18 for the selected software application 20. The installation functions on the content server 16 are generally governed by an agent module which the user of the remote computer 10 is using to access the virtual store 18.

In one embodiment, an agent module 22 is embedded in the software application 20. The agent module 22 is actuatable by the remote computer 10 to access the virtual store 18. The agent module 22 is embedded into the software application 20 by a developer of the software application simply by incorporating a library of functions which make up the agent module 22.

In another embodiment, the agent module 22 embedded in the software application 20 is inactive until after the installation of the software application 20 on the remote computer 10. In this embodiment, a second agent module, a plug-in module 23, is installed on the remote computer 10 and used to access the virtual store 18. The plug-in module 23 is made available on the Internet or other well known resources or by other well known methods, for installation on the remote computer 10 by the user. The plug-in module 23 is preferably disposed in a software package 19, a browser, which the user of the remote computer 10 uses to access the virtual store 18. When the agent module 22 is actuated the agent module 22 and the plug-in module 23 have the same functionality, and the agent module 22 and plug-in module 23 are used interchangeably by this invention, although for clarity the embodiments will refer to one or the other module.

Upon being actuated by the virtual store 18, the plug-in module 23 sends a message via the network 14 to a server module 26 disposed on a remote server 24. One skilled in the art will realize that this example describes a remote server, but the invention will work as described if the server module 26 is also disposed on the content server 16. This particular example allows multiple content servers 16 to communicate with a single server module 26, and therefore the server module 26 is disposed on a data storage apparatus 25, such as a hard disk or any other means for storing digital information, on the remote server 24.

The server module 26 maintains a database of software applications. The developers have previously registered the use of the software application with the server module 26. If the developer had neglected to perform the registration, then this first installation attempt would fail and the server module 26 would attempt to contact the developer.

The database contains information relating to the software applications comprising the name of the application, the developer, hardware constraints, operating or other software constraints, pricing information and any other particular instructions or information helpful for the installation.

The server module 26 then transfers via the electronic connection 12 and the network 14, a dialog box to the remote computer 10. The dialog box posts installation information from the database as well as allows access to the software license agreement for the particular software. If the user chooses to read the license agreement prior to acceptance, the text is sent to the remote computer either from the server module 26, from storage within the database, or a link to the developer's page on the World-Wide Web is exercised. In either case, acceptance of the license is generally required before continuing, though the developer may choose to perform this function during the software installation itself.

In the preferred embodiment, the dialog box displays information prepared by an independent auditor relative to assuring that the installation software performs only certain limited functions strictly necessary for the software installation and does not examine or

transfer other data from the remote computer 10. The dialog box also gives the user the option of verifying the credentials of the installer.

If the user exercises the option to verify the credentials of the installer, the plug-in module 23 connects to an audit server 30 maintained by an independent auditor. The plug-in module 23 links to a verification program, which simply incorporates a library of functions that make up an audit module 34, disposed on a hard disk 32 in the audit server 30. The user is then invited to enter a number displayed on the display screen of the remote computer 10 by the plug-in module 23 which is a code representing the installer. The verification program 34 then authenticates the audited installer by providing the installer's name and details regarding the nature of the audit which the auditor has performed. Alternatively, the verification program 34 could be automatically initiated by having the plug-in module 23 transmit the code to the audit server 30.

The user must then input personal information, such as name, address and phone numbers, as well as billing information, such as a credit card number for example. The billing information usually must be included to enable the transaction. In the preferred embodiment, both the billing and the user information are kept confidential and are, therefore, transmitted using secure methods.

Any of various secure methods can be used, such as encoding the information in a known manner readable only by the server module 26, for example. Other such secure methods comprise key-escrow encapsulated within an application program interface ("API") such as a Secure Socket Layer in NETSCAPE, a trademark of Netscape, Inc., or CRYPTOAPI, a trademark of Microsoft Corporation.

Once the billing information is verified and the user information is recorded in the database maintained by the server module 26, the server module 26 transmits an enabling command to the plug-in module 23 which allows transmission of the software application 20 to the remote computer 10. The software application 20 is transmitted as an installation program which is then installed locally to the remote computer 10.

The agent module 22 embedded in the software application 20 remains enabled and active, and maintains communication with the server module 26. At predetermined intervals, once a week for example, the agent module 22 can then correspond with the server module 26 and inquire as to whether any updates are available to the software application. The server module 26 can then inform the agent module 22 of updates or any additional marketing information which the vendor would have the user of the software application 20 know.

Figure 2 shows a flow diagram of a method which will be described with reference to the system of Figure 1.

10 As previously described, an installation request 36 is first received by the plug-in module 23 after a user decides to purchase the software application 20.

The user is then queried whether installer verification is required 38. If so, then a code given to the user by the plug-in module 23 is input 40. The code helps determine information appropriate to the software application 20 and the installer, which should be transmitted to the user. If the installer information is sufficient and the installer is verified 41, then the installation process is continued. Otherwise, the installation is terminated 64.

The server module 26 is then contacted 42 by the plug-in module 23 and pricing, constraint information, and any special instructions are then transmitted to the user of the remote computer 10.

20 As previously described, in the preferred embodiment the user is provided with information by the independent auditor regarding the limited functionality of the installing program. The user is given the option of verifying the credentials of the installer. If the user chooses this option, the user is given the option of connecting to the auditor via a Web Browser such as NETSCAPE or directly by the plug-in module 23. Once connected to the audit module housing the verification program 34 disposed on the audit server 30 provided by the independent auditor 36, the user will have the opportunity to review the assurances

provided by the auditor and to verify that the installer is known to the auditor. To perform the verification, the user would enter a code which might be a checksum for the installer and the software application 20 of the installer, would appear on the user screen 10. Using this code, the auditor would verify that the installer is certified by the auditor. At this stage, the user also has the option of registering with the installer by entering user information such as name, address and phone number, regardless of whether the user will purchase a software application from the installer. After the verification, the user would also have the option of terminating the installation.

The user then inputs billing information 44. The billing information can be credit card numbers, debit card numbers, a pre-established account number, or a bank account number or any of various other finance related numbers or forms of electronic commerce.

At this stage, the user has the option of entering user information such as name, address and phone number, so that ultimately the installer can track who is using the software application 20. The plug-in module 23 at this point also extracts from the remote computer 10 serial number information or any other information particular to that remote computer 10 that is software accessible. In the preferred embodiment, the other information includes hardware and configuration information of the machine. The remote server 24 via the server module 26 is used to determine whether or not the remote computer 10 is capable of running the software application 20 which the user intends to purchase. Often such serial number information is retrievable simply by making a call to the BIOS of the remote computer 10. Both the information specific to the remote computer 10 and the user of the remote computer 10 may be stored on the data storage apparatus 25 as identification information.

The billing information is then transferred back to the server module 26, which verifies the billing information 46. Such verification in the preferred embodiment is done by communicating the numbers to a central source of verification in much the same manner as is done for conventional transactions. That is, the credit card number is transmitted to a

credit card number verification service and a verification code is transmitted back. If the billing information is not accepted 48, then the user is invited to input new billing information 44. If the billing information is accepted 50, then the plug-in module 23 is sent an enabling signal which allows transfer of installation modules 52 of the software application 20 to the remote computer 10. The installation modules are generally executable modules which are created by the server at the time of a request by the plug-in module 23 so as to contain only the particular product options which the user has purchased. Therefore, the executable code can be configured so that it will only operate on the remote computer 10 for which the user has purchased the application software 20.

10       The executable code is transmitted as a self-extracting executable as is well known in the art. The plug-in module 23 then executes the self-extracting executable which proceeds to automatically install the software application 20 on the remote computer 10.

      The user then follows the procedure proscribed therein to install the software on the remote computer 10. The server module 26 during this process monitors the installation to  
15   verify the installation 54. Upon completion, the plug-in module 23 in the software application transmits installation information back to the server module 26. If the installation failed, or was unsuccessful 56, then the installation logs and the identification information are transmitted to a technical department 58 of the installer or the developer such that contact can be made to the user directly. The transmission to the technical  
20   department can be by any known communication method including manual contact. In the preferred embodiment, however the technical department would be disposed upon the network and in electrical communication with the server module 26. The technical support person would then have, prior to making any contact with the user, complete information related to the hardware and software and the installation attempt, all prior to contacting the  
25   user thus expediting the support process.

      If the installation was successful 60, then the user inputs whether the user wishes automatic notification of future updates and relevant messages 62. If the future contacts are

enabled then each time the vendor of the software application 20 updates the software application 20 or transmits information relevant to the software application 20, the agent module 22 detects the message/change and informs the user.

The procedure is then complete 64.

5        Figure 3 is a method similar to that of Figure 2 and will be described with reference to the same system of Figure 1, but in this method an update is being requested 70. An update is requested generally in one of two circumstances: the user has received a demo version of the application software on either a physical medium, such as diskette or CD ROM, or has downloaded a demo version from the vendor, or a new version of the software  
10    has been produced by the developer. In either event though, the user is requesting to purchase a new version from the vendor.

      If the software is a demo version, then there would generally be a soft button in the graphic user interface ("GUI") that allows the user to buy the software. Selecting the button activates the agent module 22, the agent module 22 then contacts the server module 26. If  
15    a new version of the software has been produced then, as previously described, the agent module 22 which periodically contacts the server module 26 for information on new versions has likely informed the user of the availability of the new version. In this case, the agent module 22 is simply being instructed by the user to update the software application 20.

      In either event, the update request 70 actuates the agent module 22 to send a signal  
20    to the server module 26 requesting the update while also transmitting the identification information 72. The identification information is again secure, like the billing information, and includes user information and computer information specific to the remote computer 10, as well as information relating to the software application 20 which is to be updated.

      A check is performed to confirm that the update is being requested by the same  
25    remote computer 10 on which the software application 20 was originally installed 80. Then, the server module 26 checks for the availability of a newer or a full version 78. In this way,



piracy is inhibited in that the same remote computer 10 must be requesting the update as was the one that originally requested the software application 20. Under some circumstances, the remote computer 10 may change for reasons other than pirating software. Such circumstances can include replacing the computer with a more modern computer or  
5 transferring the software application 20 pursuant to the terms of the license agreement to a third party. Under these circumstances, the user may transfer the information specific to the remote computer 10 to the new computer as long as verification is made that the old computer either no longer exists or is no longer loaded with the software application 20.

A comparison 74 is then performed in the remote server 24 to check whether the  
10 software application 20 is an old version or is a demo version. If it is the most current version 76, then the procedure is complete 92 and the update request is canceled.

If this request is not made and it is determined that the user is pirating the software 82, then a signal is sent from the server module 26 to the agent module 22 in the remote computer 10 to disable the program 94. The program will then no longer be usable by the  
15 remote computer 10 and only the complete new installation including a purchase of the software will re-enable the software.

If the remote computer 10 is the same machine 84, then the hardware constraints are then rechecked 86. This is to insure that the new updated software does not have additional hardware constraints that the previous version had not had.

20 If the software update is more than simply a maintenance update, there may be additional billing necessary. The user is then enabled to use the previous billing information or input new billing information 88. Upon verification of the billing information, the new version is then installed 90 and the procedure is complete 92.

Referring now to Figure 4, another application of the invention is shown. A  
25 corporate network 102 is shown having a corporate server 100. The corporate server 100 is in electrical communication with both the corporate network 102 and the outside network

14, i.e., the Internet. The corporate network 102 provides a communication bus for a client computer 104 as well as numerous other client and server computers 106.

It should be noted that a typical corporate network, or intranet, of a large corporation is actually quite like the previously described Internet in that a great variety of networks and equipment are linked together through a variety of sub-networks and routers. Again, like the Internet, there is almost no method in such a network to install or de-install software across subnets, and certainly not across different networks.

In this embodiment, the user of the client computer 104 wishes to purchase a new software application. The installation and payment can proceed exactly as previously described for a non-networked computer if so desired. Generally though, a corporate network has network administrators who try to keep software applications uniform and purchasing departments, which try to govern spending. Therefore, in such an installation, the corporate server 100 contains on its hard disk 108 multiple software applications 110, 112, each having an agent module embedded therein as previously described.

The system administrator for the corporate network 102 would generally purchase a predetermined number of licenses for the software application 110 using a method similar to that previously described or upload them directly from a vendor's disk. The user would then access the software application 110 using the client computer 104 via the corporate network 102. Requesting installation of the applications software 110 causes the agent contained therein to contact a server module 114 which, in this embodiment, is stored on the hard disk 108 of the corporate server 100. The server module 114 monitors the number of licenses and, if more are available, then enables the installation.

If additional licenses are required, the server module 114 contacts the remote server 24 and requests additional licenses 116. If the system administrator has approved the transaction, for example by having a standing pre-approval of no more than two additional license without confirmation, then the license 116 is downloaded and a message is sent to the system administrator.

Periodically, an auditing module 118 on the data storage apparatus 25 of the remote server 24 queries the corporate server 100 for information relating to licenses and installations. The server module 114 then transfers such information to the remote server 24.

5       The capability of being audited by an independent auditor provides a user assurance that the user's privacy will be protected. The auditing system herein described is physically and organizationally separate from a software developer, the virtual store, or, in the case of a corporate intranet, a department of the corporation. This separateness allows for a server to be dedicated to the sole task of installing software and for this server to be placed in a  
10       physically secure setting. Thus, the remote server 24 can be situated in a locked room dedicated solely to the task of installing software. By periodically examining the disk of this server with software appropriate for this task, which is well known in the art, the data returned to this server could be verified not to contain any data other than that required to complete the installation.

15       Figure 5 shows a system configuration where the functions previously handled by the single remote server 24 have been divided among several servers and should, therefore, be read with continuing reference to Figure 1. A router 120 routes incoming data to appropriate servers. Initially, when an agent module contacts the router 120 the request is transferred to the receptionist server 122. The receptionist server 122 verifies that the request  
20       is from an authorized agent module, and then transfers the request to server A 124 or server B 126. Servers A and B 124, 126 actually perform the installation.

      The receptionist server 122 monitors which of servers A or B 124, 126 are currently busy and routes new requests to the less busy server 124, 126. Thus, the use of the receptionist is useful to provide loading to other servers to maintain appropriate levels of  
25       service and also provides for a configuration that is highly scalable, since additional capacity can be added simply by adding additional servers.

In an alternative embodiment, each of servers A and B 124, 126 store a predetermined set of applications. The receptionist upon receiving a request for installation of a an application stored on server B 126 automatically routes the request to that server.

Also shown is an audit server 128 which is used to continuously audit the operations  
5 of servers A and B 124, 126. In the preferred embodiment, the auditing operation also includes monitoring of data received by servers A and B from user of the remote computer 10. The auditing server 128 communicates with the independent auditor so that periodically or on demand the auditor is able to verify the actual operation of the servers A and B 124, 126.

10 The auditing operation that would take place has a dual function. The owners of the virtual store 18 are able to have accurate records as to the software that was actually installed. The user of the remote computer 10 would have the assurance that only data needed for the installation and options chosen by the user were in fact transferred to the remote server 24.

15 An additional design element of the system herein described is that it will use an exclusive audit-capable packet (XAP) to transfer data from the remote computer 10 to the remote server 24. The auditor can audit this capability by examining the C++ code, as described below, by observing a build of the software, and by verifying that the software actually running on the servers is the same software as that produced by the controlled build.

20 The following are an example of the steps that an independent auditor would use to verify that the software performs in a specific manner and does not violate the privacy interests of the user. The method described below of auditing the functionality of the software will be described using C++ calls. The C++ language is used due to its inherent mechanisms for systematic data typing such that the exact nature of data passed in packets  
25 can be controlled and defined. One skilled in the art will recognize that these steps can be performed in other languages with like functionality without departing from the essence of the invention.

In order to certify the operation of the server, the auditor will first examine the software for the server and the agent. The auditor will perform or observe a build of the software from the sources and will verify, through its audit server or by other means, that the software that was built in is the same software actually running on the remote server 24.

- 5 Finally, the auditor will supplement and confirm this audit by examining the actual data received by the servers.

To accomplish this task, the auditor will determine from the sources that the software can only receive a XAP\_Packet class and that the software can only send a XAP\_Packet class. The auditor will then examine the software and verify that a XAP\_Packet can only  
10 contain certain types of data and will note that this data is necessary for the installation of the software and does not include data that is not necessary for installation of the software.

The auditor will verify that the TCP/IP receive function occurs only inside a class XAP\_Receive, and appears only inside this class. The auditor will verify that a XAP\_Receive class can only be created using a XAP\_Packet, and the auditor will observe  
15 that the only interface to the rest of the application from the XAP\_Receive class is through the XAP\_Packet. From these observations, the auditor will be able to conclude that the application can only receive data that can be inserted into a XAP\_Packet.

The auditor will verify that the TCP/IP send function is encapsulated in a class XAP\_Ship, and appears only inside this class. The auditor will verify that a XAP\_Ship  
20 object can only be created from, a XAP\_Packet, and that therefore, without a XAP\_Packet object the application will cannot ship data over TCP/IP. The auditor will verify that the TCP/IP ship function only ships the data provided to it by XAP\_Packet. From these observations, the auditor will be able to conclude that the application can only ship data that can be extracted from a XAP\_Packet.

25 From examination of the sources, the auditor will observe that a. XAP\_Packet can only be composed of XAP\_Record objects. C++ has facilities for defining insertions and extractions from classes, which can limit the insertions and extractions to certain other

classes. The XAP\_Record classes will be defined in the application. The auditor will examine each of these classes. From examination of the individual XAP\_Record classes the auditor will conclude that these classes can be composed only of certain XAP\_Data objects. Again the XAP\_Record classes will have defined insertions and extractions which will limit  
5 the data that can be put into these records to XAP\_Data objects. Finally, the auditor will examine the various defined, XAP\_Data objects, and will observe that the XAP\_Data objects represent the data needed to perform an installation but will not permit other data that might violate a user's privacy. For example, the data objects could have predefined limits on overall length and predefined data values which would render impossible the copying of  
10 correspondence from the user's personal computer. The data objects would be limited as to size and content so that bitmaps or spread sheets, for example, could not be copied from the user's personal computer.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are, therefore, to be  
15 considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

## Claims

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A system for installing a software application to a remote computer via a network having at least one content server, comprising:  
  
a server module; and  
  
an agent module actuatable by the remote computer to initiate installation of the software application on the remote computer, the agent module upon initiation electrically communicating with the server module which selectively enables the installation.
2. The system according to claim 1 wherein the remote computer in electrical communication with the server module transmits information to the server module.
3. The system according to claim 2 wherein the information transmitted from the remote computer is billing information.
4. The system according to claim 2 wherein the software application provides associated pricing information.
5. The system according to claim 3 wherein the server module comprises billing means for verifying the billing information received from the remote computer.
6. The system according to claim 5 wherein the billing means further comprises:  
  
a central source of verification; and  
  
a software module in electrical communication with the central source of verification, which transmits the billing information to the central source and receives from the central source a verification code.

7. The system according to claim 1 further comprising an installation log, transferred by the agent module to the server module after installation of the software application is complete.
8. The system according to claim 2 wherein the information transmitted from the remote computer is identification information.
9. The system according to claim 8 further comprising:  
auditing means for recording the software application embedded by the agent module and the identification information; and  
a data storage apparatus in electrical communication with the server module for storing the said information.
10. The system according to claim 8 further comprising a technical department, in electrical communication with the server module, for selectively receiving the installation log and the identification information transmitted from the server module.
11. The system according to claim 2 further comprising a data storage apparatus in electrical communication with the server module for storing the information transmitted from the remote computer.
12. The system according to claim 11 further comprising anti-piracy means for selectively enabling the installation of the software application on the remote computer.
13. The system according to claim 12 wherein the anti-piracy means in electrical communication with the server module, compares the identification information disposed upon the data storage apparatus against information transmitted from the remote computer.
14. The system according to claim 2 further comprising security means for confidentially transmitting the information.



15. The system according to claim 14 wherein the security means is a an encryption software module.
16. The system according to claim 1 wherein the agent module and the server module bi-directionally communicate.
17. The system according to claim 1 wherein the server module and agent module are disposed upon the content server.
18. The system according to claim 1 wherein the network further comprises a remote server having the server module disposed thereon, having the agent module disposed on the content server.
19. The system according to claim 1 wherein the network is an intranet.
20. The system according to claim 1 wherein the network is an internet.
21. The system according to claim 1 further comprising:  
an audit server disposed remotely from the content server; and  
an audit module disposed on the audit server, the audit module in electrical communication with the server module for communicating to the remote computer information regarding the functionality of the agent module which selectively enables the installation.
22. The system according to claim 1 further comprising:  
an audit server disposed remotely from the content server;  
an installation file embedded in the agent module; and  
an audit module disposed on the audit server, the audit module in electrical communication with the server module for communicating to the remote computer information regarding the functionality of the installation file.
23. The system according to claim 1 further comprising:  
an audit server disposed remotely from the content server; and

- an audit module disposed on the audit server in electrical communication with the agent module, selectively enabled by the agent module for verifying an installer of the software application.
24. A method for installing a software application on a remote computer via a network the method comprising the steps of:
- selecting by the remote computer the software application to be installed
- where the software application is actuatable by the remote computer;
- communicating the request from an agent module to a server module, the server module disposed upon a content server;
- transmitting an information request from the server module to the remote computer; and
- selectively transmitting the software application as an installation file to the remote computer.
25. A method according to claim 24 further comprising the steps of:
- receiving identification information from the remote computer; and
- storing the identification information on a data storage apparatus in electrical communication with the server module.
26. A method according to claim 24 further comprising the step of securing the confidentiality of the transfer of the information between the remote computer and the server module.
27. A method according to claim 26 further comprises the steps of comparing the information disposed on the data storage apparatus against the identification information from the remote computer to ascertain piracy by the remote computer.
28. A method according to claim 25 further comprising the step of disabling the software application on the remote computer.

29. The method of claim 24 further comprising the steps of:  
selectively connecting the remote computer to an audit server upon actuation by  
the remote computer of the agent module, actuation of the agent module  
enabling the verification of the installer of the software application; and  
5 displaying on the remote computer an output of the verification.
30. The method of claim 24 further comprising the steps of:  
selectively initiating the agent module to communicate with an audit module  
disposed upon an audit server, the audit server disposed remotely from the  
content server;  
5 executing a verification program disposed upon the audit server, upon selection by  
the remote computer to verify the installer of the software application; and  
displaying on the remote computer an output of the verification program.
31. A method for auditing an agent module to verify the installation of a software  
application by the agent module comprising the steps of:  
examining by an audit module, the audit module disposed upon an audit server, the  
software application having an embedded agent module in electrical  
5 communication with the audit module, the audit module disposed remotely  
from the agent module;  
examining the software application disposed remotely from the software application  
having an embedded agent module by the audit module; and  
comparing the software application having an embedded agent module against the  
10 software application disposed remotely from the software application having  
an embedded agent.
32. The method of claim 31 wherein the step of examining the software application  
further comprising the steps of:

ascertaining that the software application exclusively transmits a unique packet,  
the unique packet selectively encapsulated by a transmit header generated  
from the unique packet;

ascertaining that the software application exclusively receives the unique packet,  
the unique packet selectively encapsulated by a receive header generated  
from the unique packet;

verifying the unique packet exclusively contains predetermined objects; and

verifying the predetermined objects are necessary to the functionality of the  
installation of the software application.

1/5

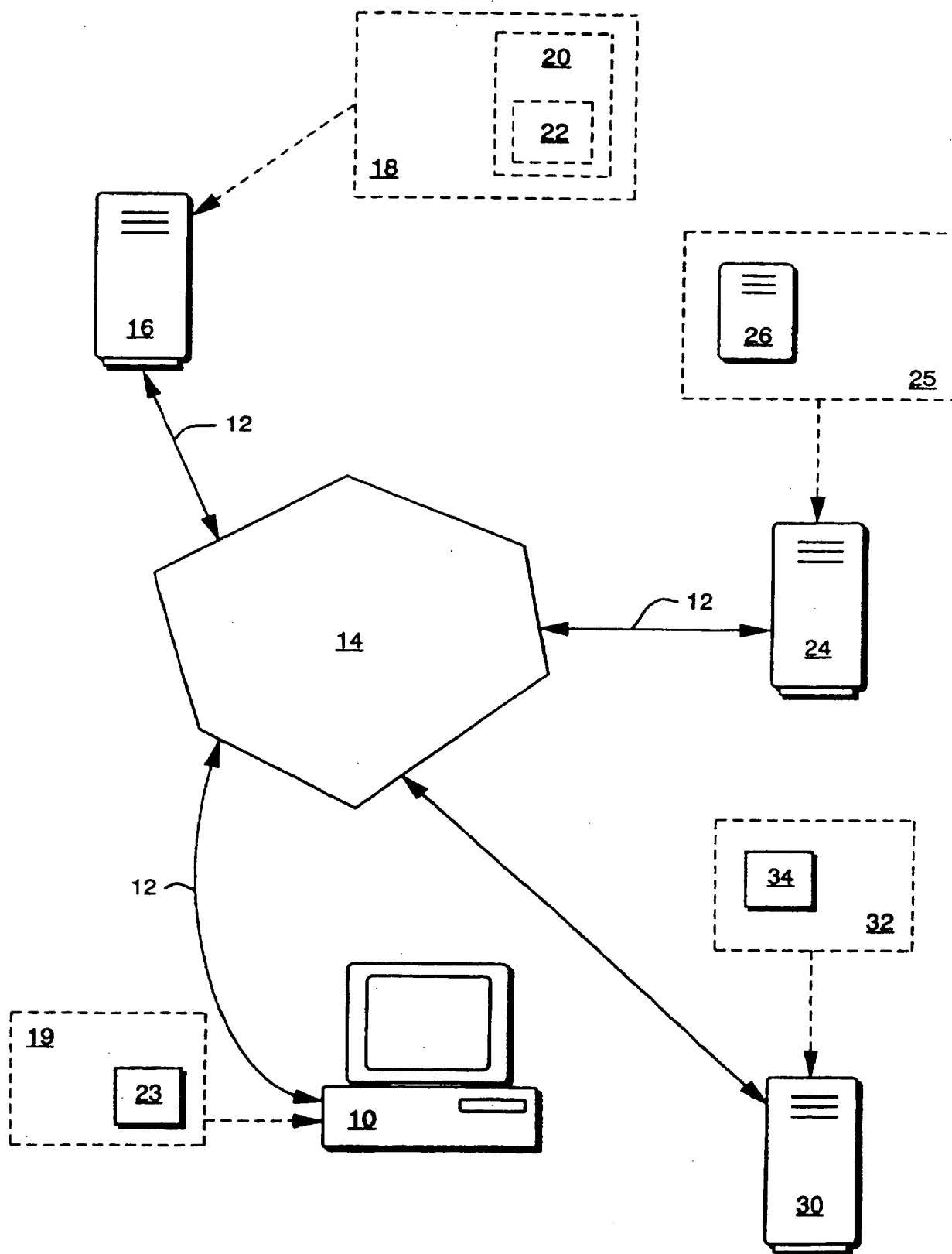


FIG. 1

SUBSTITUTE SHEET (RULE 26)

2/5

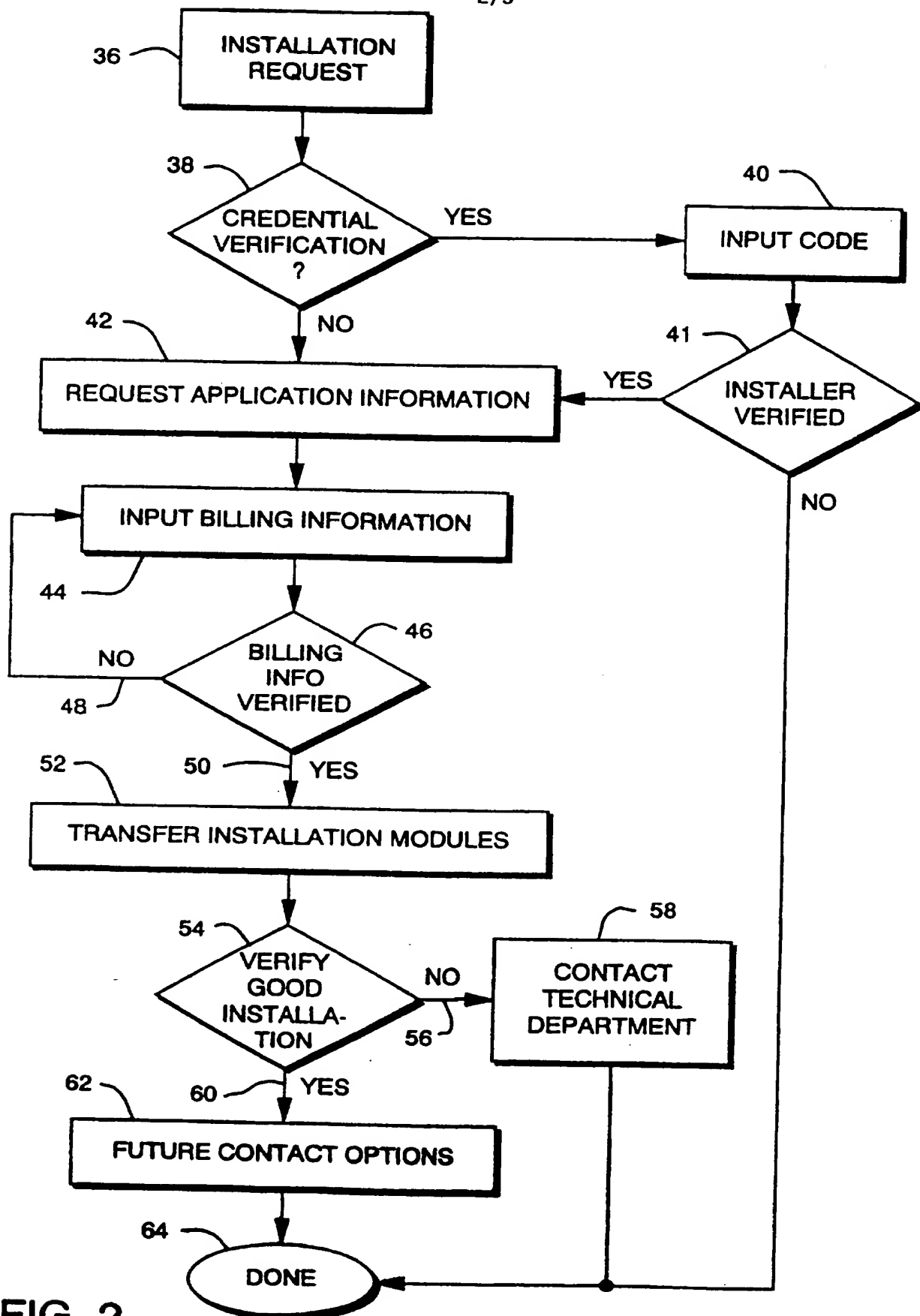
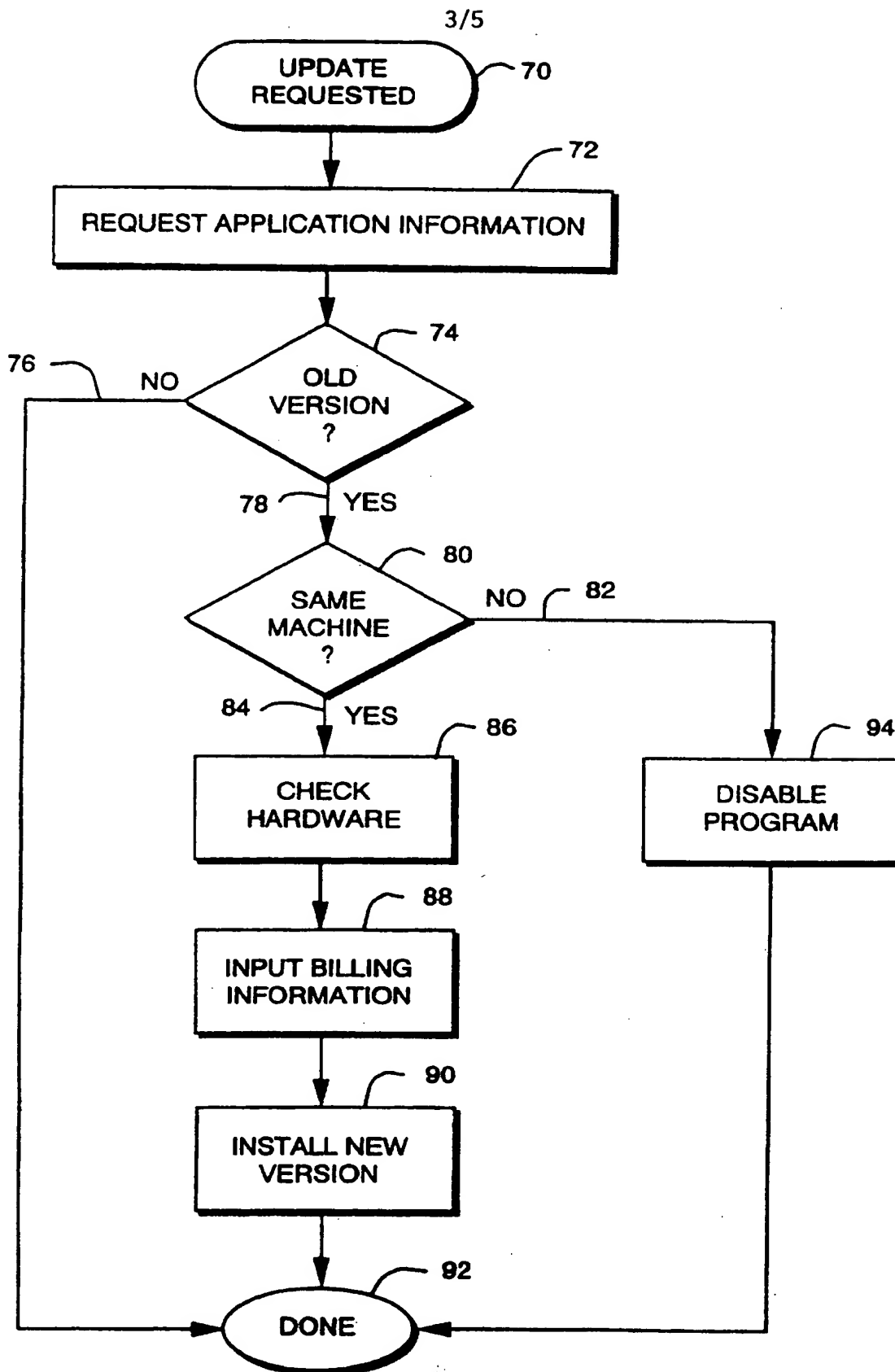
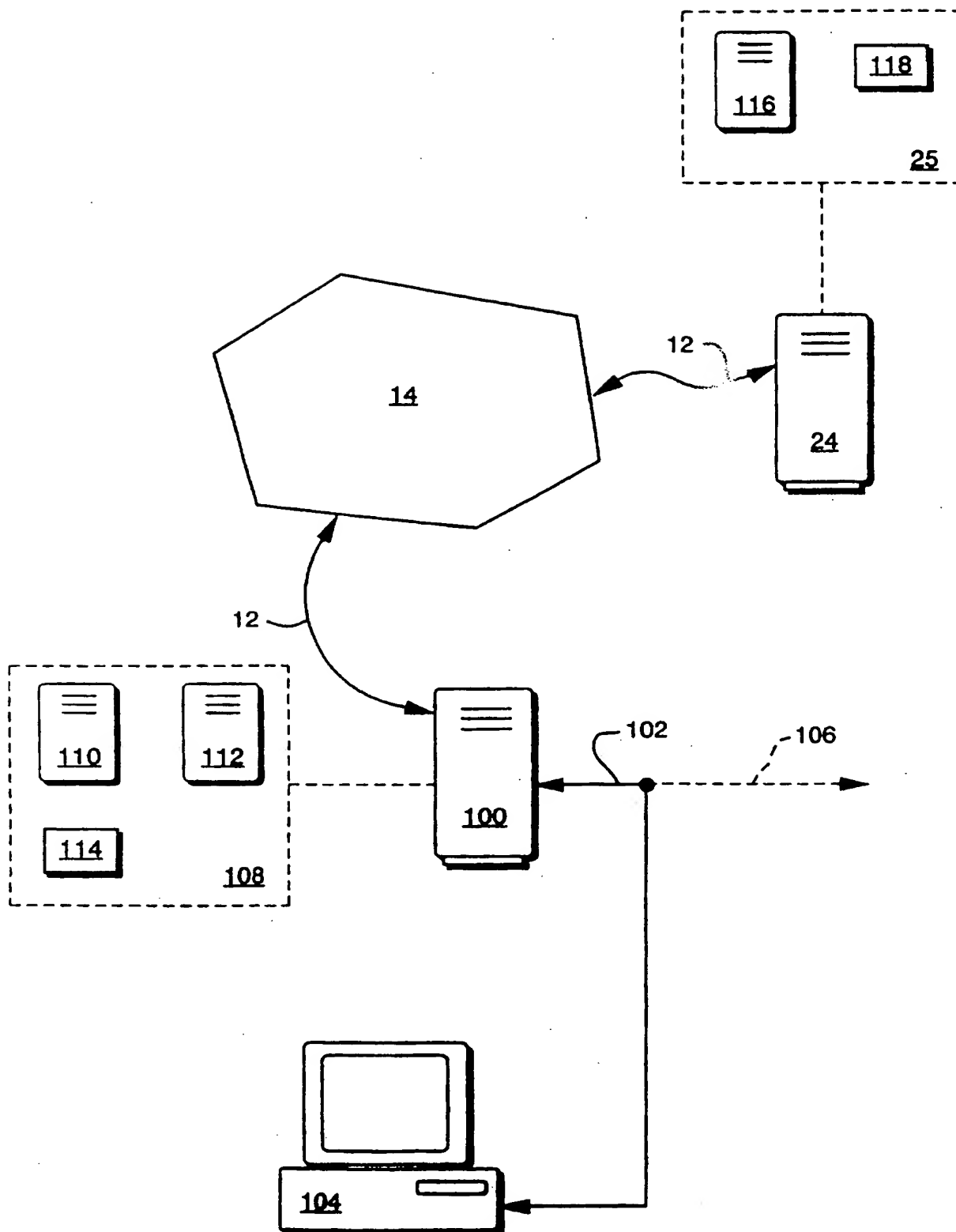


FIG. 2

**FIG. 3**

SUBSTITUTE SHEET (RULE 26)

**FIG. 4**



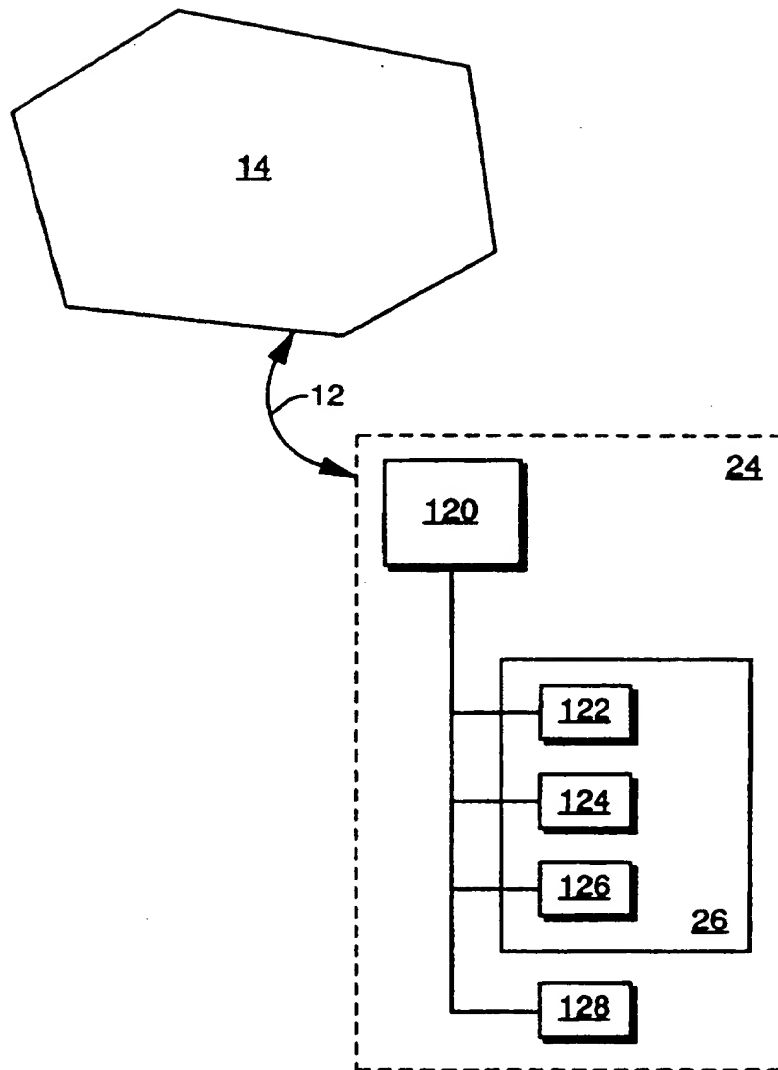


FIG. 5

SUBSTITUTE SHEET (RULE 26)

# INTERNATIONAL SEARCH REPORT

Inter      nal Application No  
PCT/US 97/11548

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6    G06F1/00    G06F9/445

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 6    G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	EP 0 778 512 A (SUN MICROSYSTEMS INC) 11 June 1997  see abstract; figures 1,4-6,9 see column 6, line 28 - column 7, line 14 see column 9, line 47 - column 10, line 39 see column 12, line 36 - line 49 ---	1,2, 11-16, 19,20, 24-28
Y	EP 0 703 531 A (COMPAQ COMPUTER CORP) 27 March 1996  see the whole document ---  -/-	1-3,5-9, 11-16, 19,20, 24-28

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*A\* document member of the same patent family

Date of the actual completion of the international search  18 November 1997	Date of mailing of the international search report  24.11.97
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer  Powell, D

# INTERNATIONAL SEARCH REPORT

Interr      1st Application No  
PCT/US 97/11548

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 999 806 A (CHERNOW FRED ET AL) 12 March 1991  see the whole document	1-3,5-9, 11-16, 19,20, 24-28
A	CHII-REN TSAI ET AL: "DISTRIBUTED AUDIT WITH SECURE REMOTE PROCEDURE CALLS" PROCEEDINGS OF THE ANNUAL INTERNATIONAL CARNAHAN CONFERENCE ON SECURITY TECHNOLOGY, TAIPEI, OCT. 1 - 3, 1991, no. CONF. 25, 1 October 1991, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, pages 154-160, XP000300426 see the whole document	21-23, 29-31
A	TAKAHATA M ET AL: "REAL-TIME VIDEO-ON-DEMAND SYSTEM BASED ON DISTRIBUTED SERVERS AND AN AGENT-ORIENTED APPLICATION" PROCEEDINGS OF THE SPIE, vol. 2663, 31 January 1996, pages 242-251, XP000675284	
A	US 5 023 907 A (JOHNSON HERRICK J ET AL) 11 June 1991	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 97/11548

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0778512 A	11-06-97	NONE	
EP 0703531 A	27-03-96	US 5586304 A	17-12-96
		AU 3053895 A	21-03-96
		CA 2157728 A	09-03-96
		JP 8227355 A	03-09-96
		US 5588143 A	24-12-96
US 4999806 A	12-03-91	NONE	
US 5023907 A	11-06-91	NONE	

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

☒ **BLACK BORDERS**

☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**

☐ **FADED TEXT OR DRAWING**

☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**

☐ **SKEWED/SLANTED IMAGES**

☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**

☐ **GRAY SCALE DOCUMENTS**

☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**

☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**

☐ **OTHER: \_\_\_\_\_**

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**

**This Page Blank (uspto)**